

## Lessons Learned in Building the Ares Projects

John P. (Phil) Sumrall

Since being established in 2005, the Ares Projects at Marshall Space Flight Center have been making steady progress designing, building, testing, and flying the next generation of exploration launch vehicles. Ares is committed to rebuilding crucial capabilities from the Apollo era that made the first human flights to the Moon possible, as well as incorporating the latest in computer technology and changes in management philosophy. One example of an Apollo-era practice has been giving NASA overall authority over vehicle integration activities, giving civil service engineers hands-on experience in developing rocket hardware. This knowledge and experience help make the agency a “smart buyer” of products and services. More modern practices have been added to the management tool belt to improve efficiency, cost effectiveness, and institutional knowledge, including knowledge management/capture to gain better insight into design and decision making; earned value management, where Ares won a NASA award for its practice and implementation; designing for operability; and Lean Six Sigma applications to identify and eliminate wasted time and effort. While it is important to learn technical lessons like how to fly and control unique rockets like the Ares I-X flight test vehicle, the Ares management team also has been learning important lessons about how to manage large, long-term projects.



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*NASA Masters Forum*

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**Lessons Learned in Building the  
Ares Projects**



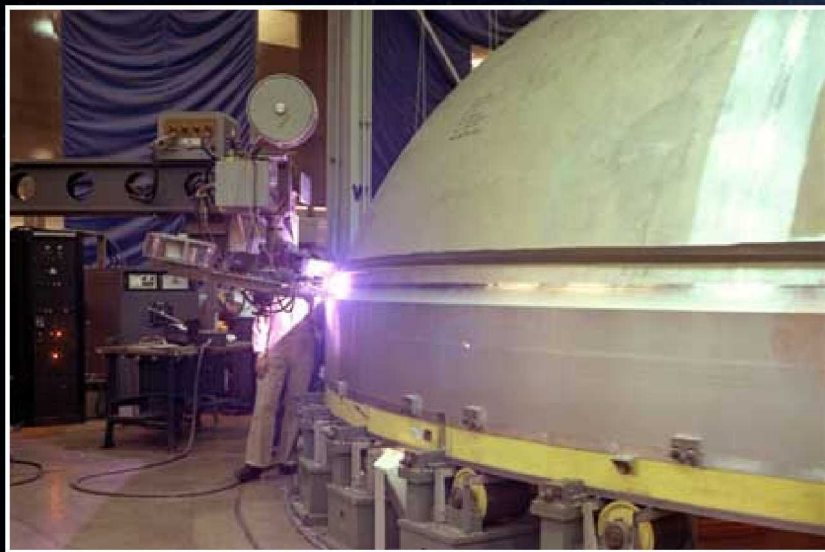
# Agenda

- ◆ **Rebuilding In-house Capabilities from the Apollo Era**
- ◆ **NASA Vehicle Integration Activities**
- ◆ **Making the Agency a “Smart Buyer”**
- ◆ **Anticipating Problems**
- ◆ **Knowledge Management / Capture**
- ◆ **Lean Six Sigma**
- ◆ **Design, Development, Processing, Flying, and Controlling New Launch Vehicles**
- ◆ **Q & A**





# Rebuilding In-house Capabilities from the Apollo Era





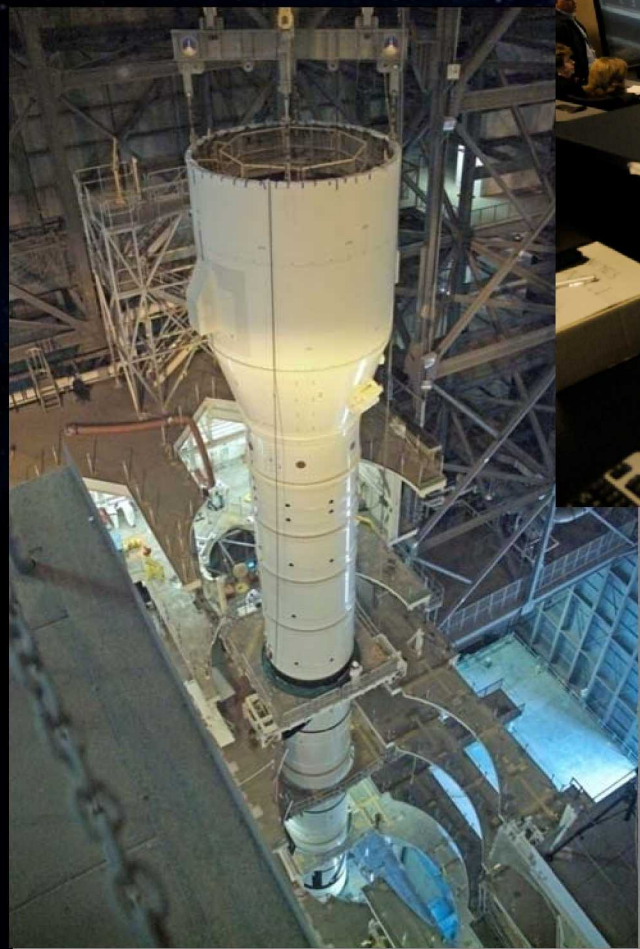
# Establishing and Fixing Requirements Early

- ◆ Why is it advantageous to do this?
- ◆ How well are we doing it?
- ◆ What can be done to make it better?
- ◆ What could any project—not just Ares—learn from doing this?





# NASA Vehicle Integration Activities





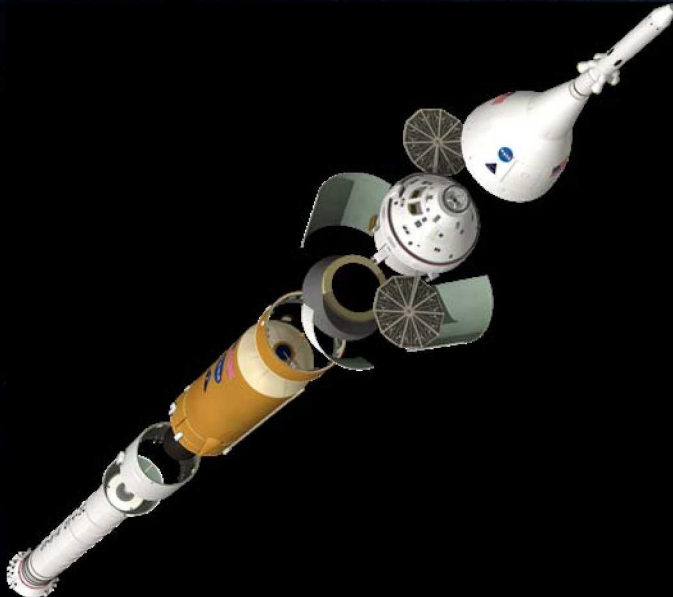
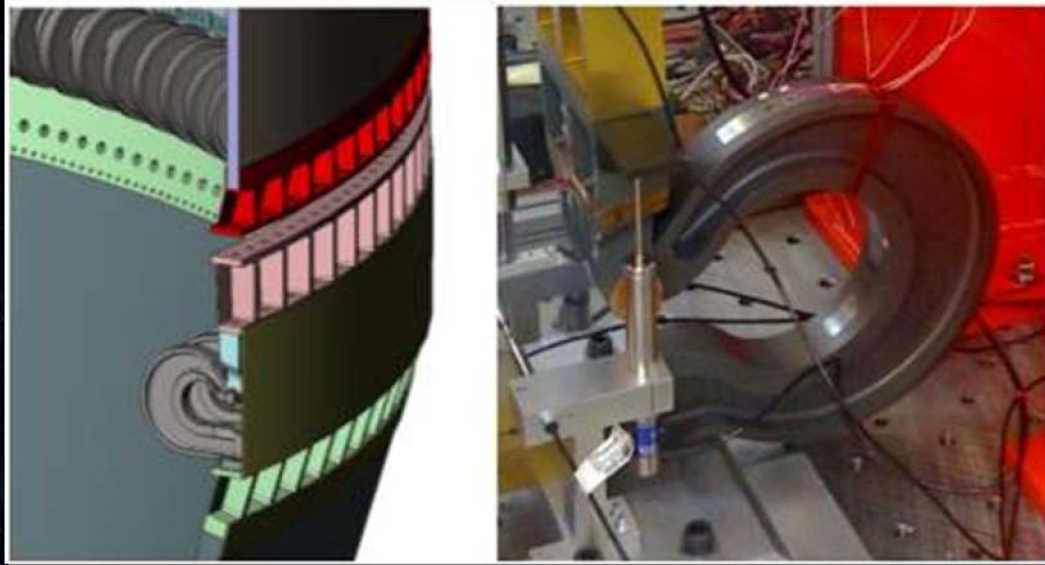


# Hands-on Experience / Making the Agency a “Smart Buyer”





# Anticipating Problems







# Knowledge Management / Capture

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Welcome to the NASA ESMD Integrated Risk & Knowledge Management Portal min

The Risk and Knowledge Management Portal provides a wide array of resources and services for the ESMD Risk and Knowledge Management community. The portlets to the right expose you to the existing practices designed to generate and share knowledge for reuse. These practices aid in the effort to integrate risk and knowledge management over the life cycle of Constellation and Advanced Capabilities Division programs.


Risk and Knowledge Management Portal Highlights min

- The next ESMD Top Risk Review (TRR) is scheduled for 10 May 2010.
- Check out the March 2010 Systems Engineering Seminar, "Engineering a Successful Mission: Lessons from the Lunar Reconnaissance Orbiter." [Click here](#) to access the charts.
- Defense Acquisition University. [Program Managers e-Tool Kit](#)
- Process 2.0 Facilitator Training is now ON-LINE. [Click here](#) to access this course.
- The ESMD Top Risk List, dated 21 October 2009, is located [here](#).
- Courseware for the USAF Alternatives Analysis (AoA) Course is available in our [wiki](#).
- CAIB Meeting Minutes have been uploaded to Windchill and may be found [here](#).
- Check out the latest KBR: "Micrometeoroid and Orbital Debris -- Unclear and Present Danger"
- Check out [Riskapedia](#) - A tool that assists you with risk identification, risk analysis, and risk mitigation techniques.
- Visit the [MOD](#) site and check out the [Lessons Learned on Apollo](#).
- Need Help Finding It?** Fill out the form below and we will help you locate a risk record, document, report, article, and other resources.


Knowledge Based Risks

KBRs capture risks that have been successfully mitigated in the past that are potentially relevant to many current topics. [Learn more about KBRs.](#)


KBR Spotlight:



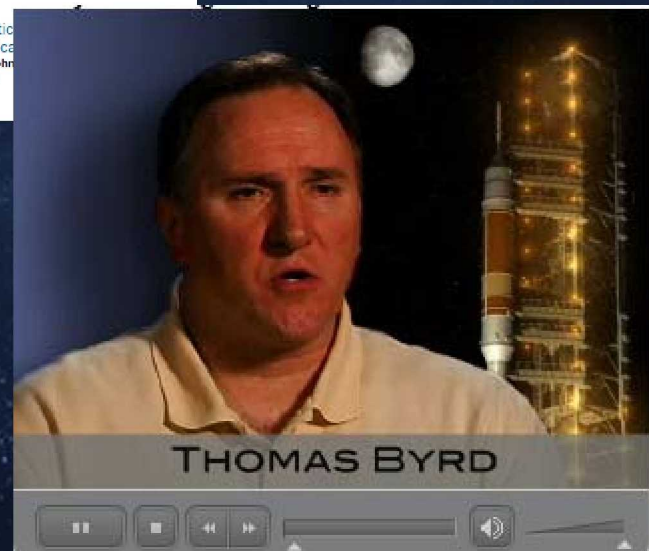
"Adequate Instrumentation"  
Michael Garske  
Senior Project Manager, Orbiter Project Office



"Interface Control and Verification"  
Brian Muirhead  
Project Manager for Mars Pathfinder



"Unanticipated Electrical"  
Gary Johnson  
Retired





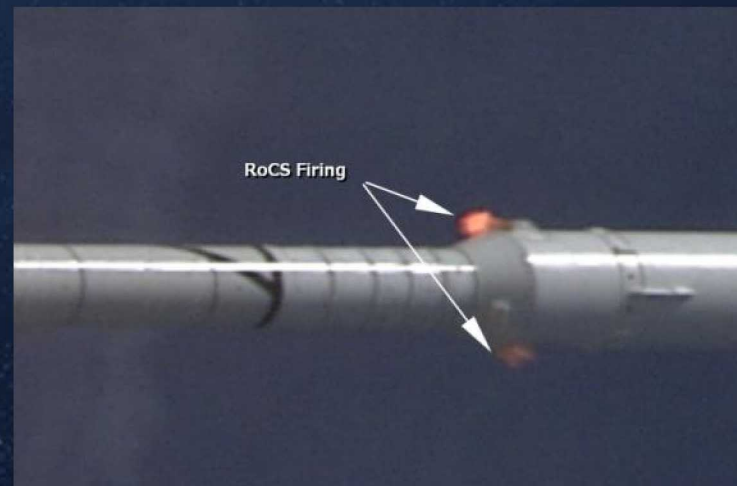
# Lean Six Sigma







# Design, Development, Processing, Flying, and Controlling New Launch Vehicles





# Q & A